Circle Coordinate Geometry

1.

A circle has equation $(x-2)^2+(y+3)^2=13$

Find the gradient of the tangent to this circle at the origin.

Circle your answer.

[1 mark]

$-\frac{3}{2}$ $-\frac{2}{3}$ $\frac{2}{3}$ $\frac{3}{2}$

2.

A circle has equation $(x-4)^2+(y+4)^2=9$

What is the area of the circle?

Circle your answer.

[1 mark]

3π 9π 16π 81π

3.

The circle with equation $(x-7)^2+(y+2)^2=5$ has centre C.

(a) (i) Write down the radius of the circle.

[1 mark]

(a) (ii) Write down the coordinates of C.

[1 mark]

(b) The point P (5, –1) lies on the circle.

Find the equation of the tangent to the circle at P, giving your answer in the form $y=mx+c$

[4 marks]

(c) The point Q (3, 3) lies outside the circle and the point T lies on the circle such that QT is a tangent to the circle. Find the length of QT.

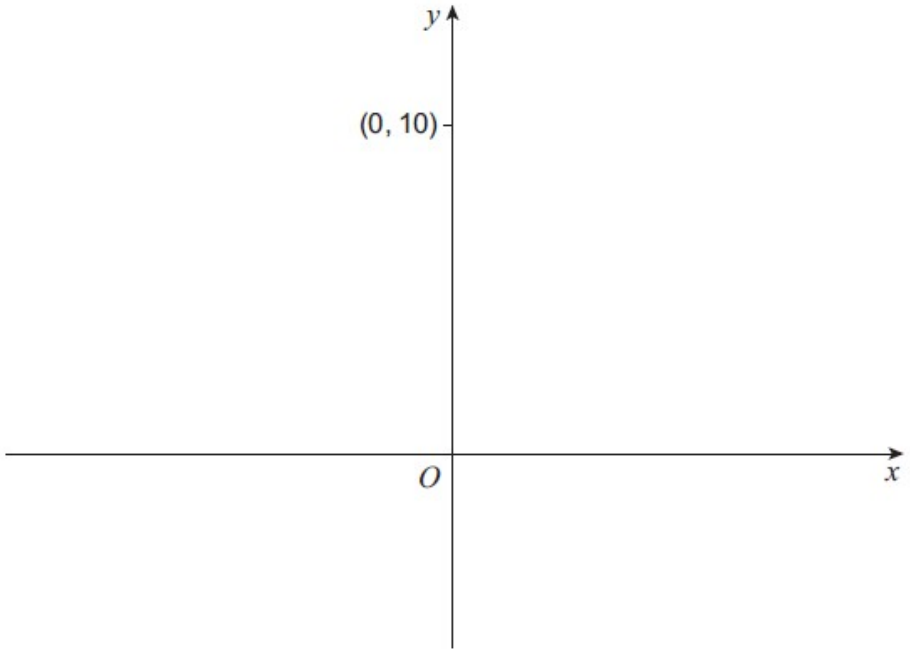
[4 marks]

4.

A circle of radius 6 passes through the points (0, 0) and (0, 10).

(a) Sketch the two possible positions of the circle.

[1 mark]



(b) Find the equations of the two circles.

[3 marks]

5.

A circle with centre C has equation $x^2 + y^2 + 8x - 12y = 12$

(a) Find the coordinates of C and the radius of the circle.

[3 marks]

(b) The points P and Q lie on the circle.

The origin is the midpoint of the chord PQ.

Show that PQ has length $n\sqrt{3}$, where n is an integer.

[5 marks]

6.

Circle C_1 has equation $x^2 + y^2 - 8x - 14y = -40$

Circle C_2 has equation $(x - 16)^2 + (y - 12)^2 = 49$

(a) Determine whether C_1 and C_2 intersect.

[7 marks]

(b) Find the maximum distance between a point on C_1 and a point on C_2.

[2 marks]

7.

Three points A, B and C have coordinates A (8, 17), B (15, 10) and C (−2, −7)

(a) Show that angle ABC is a right angle.

[3 marks]

(b) A, B and C lie on a circle.

(b) (i) Explain why AC is a diameter of the circle.

[1 mark]

(b) (ii) Determine whether the point D (−8, −2) lies inside the circle, on the circle or outside the circle.

Fully justify your answer.

[4 marks]